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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/062,443	02/05/2002	Chandrakant D. Patel	100110202-1	2568

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HEWLETT-PACKARD COMPANY  
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EXAMINER

SURYAWANSHI, SURESH

ART UNIT	PAPER NUMBER
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2115

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/062,443

Applicant(s)

PATEL ET AL.

Examiner

Suresh K. Suryawanshi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/7/05 amendments.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 and 18-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 18-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Claims 1-15 and 18-29 are presented for examination.

#### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 1-5, 8-10, 12-15, 18, 20-23, 25-26 and 28-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Lopez (US Patent No 5,509,468).

4. As per claim 1, Lopez teaches a system for cooling at least one computer component [Fig. 6], said system comprising:

a plurality of cold plates adapted to transfer heat from a plurality of compute components to a cooling fluid, wherein the cooling fluid flows through respective interiors of the plurality of cold plates [Fig. 1, 2 and 6; col. 3, lines 28-37; col. 4, line 19 -- col. 6, line 57];

a supply line to supply said cooling fluid into, and out from, said plurality of cold plates [Fig. 1, 2 and 6; col. 3, lines 28-37; col. 4, line 19 -- col. 6, line 57]; and

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a housing having one or more racks configured to support said plurality of computer components, said one or more racks further configured to support said plurality of cold plates in thermal communication with said plurality of computer components [col. 1, lines 30-36; Fig. 1, 2 and 6; here the enclosure or the cabinet is a housing having one rack configured to support a plurality of circuit boards; col. 3, lines 28-37 and col. 4, line 19 -- col. 6, line 57 detail about use of plurality of cold plates in thermal communication with the plurality of computer components].

5. As per claim 12, Lopez teaches a system for cooling a plurality of computer components [Fig. 1], said system comprising:

a plurality of means for absorbing heat from the plurality of computer components [Fig. 1, 2 and 6; col. 3, lines 28-37; col. 4, line 19 -- col. 6, line 57; cooling plates];

means for holding the plurality of computer components in thermal attachment with the plurality of means for absorbing heat [Fig. 1, 2 and 6; col. 3, lines 28-37; col. 4, line 19 -- col. 6, line 57; col. 9, lines 27-36; circuit board slots];

means for supplying cooling fluid into the plurality of means for absorbing heat, wherein the means for supplying cooling fluid is configured to variably supply cooling fluid into the plurality of means for absorbing heat [Fig. 1, 2 and 6; col. 3, lines 28-37; col. 4, line 19 -- col. 6, line 57; fluid receptacle containing fluid compressor and heat exchanger; col. 9, line 61 -- col. 10, line 25; flow rate controller].

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6. As per claim 20, Lopez teaches a method for cooling at least one computer component, said at least one computer component being thermally attached to a cold plate [Fig. 1], said method comprising:

Supplying cooling fluid into the cold plate from a supply line for supplying cooling fluid into a plurality of cold plates [Fig. 1, 2 and 6; col. 3, lines 28-37; col. 4, line 19 -- col. 6, line 57];

varying the amount of cooling fluid supplied into the cold plate based upon at least one detected condition [col. 9, line 61 -- col. 10, line 25; flow rate controller]; and

circulating the cooling fluid through the cold plate and out of the plate such that heat is absorbed from the at least one computer component into the cooling fluid circulating in the cold plate [Fig. 1, 2 and 6; col. 3, lines 28-37; col. 4, line 19 -- col. 6, line 57; col. 9, line 18 -- col. 10, line 25].

7. As per claim 2, Lopez discloses a heat exchanger adapted to transfer heat from the cooling fluid to a medium, to thereby cool the cooling fluid [Fig. 1; heat exchanger; col. 5, lines 32-37].

8. As per claims 3 and 8, Lopez discloses a plurality of controllable valves positioned along the supply line to control the flow of cooling fluid into each of the plurality of cold plates [Fig. 2 and 6; valves 172 and 176].

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9. As per claims 4 and 13-14, Lopez discloses an electronic controller configured to control the supply of cooling fluid into each of the plurality of cold plates [Fig. 6; col. 9, line 60 -- col. 10, line 25; flow rate controller].

10. As per claim 5, Lopez discloses that said electronic controller is configured to modulate the cooling of at least one of said computer components based upon the cooling fluid supplied to each of the plurality of cold plates [Fig. 6; col. 9, line 60 -- col. 10, line 25; flow rate controller].

11. As per claim 9, Lopez discloses a fluid reservoir attached to said supply line [Fig. 1; col. 5, lines 32-34; fluid receptacle]; and one or more pumps operable to circulate the fluid [Fig. 1; col. 5, lines 32-34; fluid compressor].

12. As per claim 10, Lopez discloses a temperature gauge for detecting temperature of at least one of the cooling fluid, a cold plate and the at least one computer component, and wherein the electronic controller is configured to control the supply of cooling fluid into each of the plurality of cold plates based upon the temperature detected by the temperature gauge [Fig. 6; col. 9, line 60 -- col. 10, line 25].

13. As per claim 15, Lopez discloses means for cooling the cooling fluid [Fig. 1; heat exchanger].

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14. As per claim 18, Lopez discloses means for monitoring temperature [Fig. 6; temperature sensor].

15. As per claim 21, Lopez discloses circulating the cooling fluid through a heat exchanger such that the heat exchanger absorbs heat from the cooling fluid to thereby cool the cooling fluid [Fig. 1; heat exchanger].

16. As per claim 22, Lopez discloses that wherein the step of varying the amount of cooling fluid supplied into the cold plate further comprises using one or more valves to vary the amount of cooling fluid supplied to the cold plate [Fig. 6; valves 172 and 176; flow rate controller].

17. As per claim 23, Lopez discloses monitoring a temperature of at least one of the cooling fluid, the cold plate, and the at least one computer component [Fig. 6; temperature sensor]; and wherein the step of varying the amount of cooling fluid supplied into the cold plate further comprises varying the amount of cooling fluid supplied into the cold plate based upon the monitored temperature [col. 9, line 60 -- col. 10, line 14].

18. As per claim 25, Lopez discloses anticipating a level of heat generation by the at least one computer component [Fig. 6; temperature sensor]; and wherein the step of varying the amount of cooling fluid supplied into the cold plate further comprises varying the amount of cooling fluid supplied into the cold plate based upon the anticipated heat generation level [col. 9, line 60 -- col. 10, line 14].

19. As per claim 26, Lopez discloses modulating the operation of the heat exchanger to thereby vary a level of heat exchange between the cooling fluid and the heat exchanger [Fig. 1; col. 5, lines 32-37].

20. As per claim 28, Lopez discloses that at least one computer component comprises a plurality of computer components thermally attached to a plurality of cold plates [Fig. 1], said method comprising:

supplying cooling fluid to each of the plurality of cold plates [Fig. 1]; and

individually varying the amount of cooling fluid supplied into each of the plurality of cold plates [Fig. 6].

21. As per claim 29, Lopez discloses the step of individually varying the amount of cooling fluid supplied further comprises maintaining a plurality of valves positioned along the supply line to individually vary the amount of cooling fluid supplied to each of the plurality of cold plates [Fig. 6; valves 172 and 176; valves 232 and 236].



***Claim Rejections - 35 USC § 103***

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

23. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lopez (US Patent No 5,509,468) in view of Go et al (US Patent No 5,144,531; hereinafter Go).

24. As per claims 6 and 7, Lopez discloses the invention substantially. Lopez does not expressly disclose about the use of water as a coolant fluid. But a routineer in the art would know that water could be used as a coolant fluid. However, Go expressly discloses using water as a coolant fluid [col. 3, lines 48-53]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the cited references as both are related to a cooling system particularly to a liquid cooling system wherein each circuit module is cooled with a liquid via a cold plate. Moreover, a routineer would definitely cut down the cost of the cooling system by utilizing the cold water as a coolant fluid.

25. Claims 11, 19 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lopez (US Patent No 5,509,468) in view of Posa (US Patent No 6,220,955 B1).

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26. As per claims 11, 19 and 24, Lopez discloses the invention substantially. Lopez does not disclose about controlling the supply of cooling fluid based upon measured power consumption of the at least one computer component. But clearly Lopez discloses doing the same with temperature and humidity. A routineer in the art would know that temperature is directly related to the power consumption of the components of the system. However, Posa expressly discloses a similar cooling system where the system monitors the level of power consumed and controls the source of cooling fluid [col. 3, lines 10-16]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the cited references as both are related to a cooling system. Moreover, the cooling system of Lopez definitely be benefited with the knowledge of controlling the supply of cooling fluid based upon the level of power consumption of the at least one computer component.

27. As per claim 27, Lopez discloses the invention substantially. Lopez does not disclose about controlling the supply of cooling fluid based upon a number operating components. However, Posa expressly discloses a similar cooling system where the system monitors the level of power consumed and controls the source of cooling fluid [col. 3, lines 10-16; if a component is not active, there will be no power consumption for that component]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the cited references as both are related to a cooling system. Moreover, the cooling system of Lopez definitely be benefited with the knowledge of controlling the supply of cooling fluid based upon the activeness of a computer component and that can be directly related to power consumption of the component.

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***Conclusion***

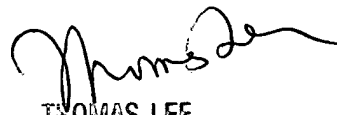
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suresh K. Suryawanshi whose telephone number is 571-272-3668. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas C. Lee can be reached on 571-272-3667. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sks

June 23, 2005



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